14632 - Lyman-alpha Imaging at ~20 pc Resolution in a Low Mass Lensed Galaxy at z=1.85

Cycle: 24, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Prof. Dawn K. Erb (PI) (Contact)	**University of Wisconsin - Milwaukee**	**erbd@uwm.edu**
Dr. Danielle Berg (CoI)	University of Wisconsin - Milwaukee	bergda@uwm.edu
Dr. Gabriel Brammer (CoI) (ESA Member)	Space Telescope Science Institute - ESA	brammer@stsci.edu
Prof. Max Pettini (CoI) (ESA Member)	University of Cambridge	pettini@ast.cam.ac.uk

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) SL2SJ021737-051329	WFC3/UVIS	2	21-Nov-2016 21:02:10.0	yes
02	(1) SL2SJ021737-051329	WFC3/UVIS	2	21-Nov-2016 21:02:10.0	yes
03	(1) SL2SJ021737-051329	WFC3/UVIS	2	21-Nov-2016 21:02:11.0	yes
04	(1) SL2SJ021737-051329	WFC3/UVIS	1	21-Nov-2016 21:02:12.0	yes
52	(1) SL2SJ021737-051329	WFC3/UVIS	1	21-Nov-2016 21:02:12.0	yes

8 Total Orbits Used

ABSTRACT

Because Lyman-alpha photons are resonantly scattered by neutral hydrogen, the strength and spatial extent of Lya emission in galaxies depend on the HI column density and covering fraction, properties that are of primary interest to the escape of ionizing radiation. Lya emission is particularly

important to the study of low mass, low metallicity galaxies: such objects are likely to be responsible for the reionization of the universe, and Lya emission is more common in these galaxies. With this proposal, we request 7 orbits of WFC3/UVIS imaging to obtain a high resolution map of Lya emission in the low mass, low metallicity z=1.85 gravitationally lensed galaxy SL2SJ021737-051329. With oxygen abundance <10% of solar, stellar mass <10^8 Msun, and extremely strong Lya emission with rest-frame equivalent width ~120 A, this object is a prime example of a low mass Lya-emitter, and its gravitational magnification by a factor of ~35 results in remarkably high WFC3/UVIS spatial resolution of ~20 pc. Existing HST broadband and IR grism observations will allow us to compare the spatial extent of the Lya emission with both the rest-frame UV continuum and the rest-frame optical nebular line emission, in order to map the resonant scattering of Lya photons from their origin in star-forming regions, obtain constraints on the location of the scattering gas, and relate this information to the kinematics and geometry of the galaxy. The proposed observations, in combination with the spectroscopic information we have already obtained, will provide the most comprehensive and highest resolution picture of Lya emission at z > 1 to date.

OBSERVING DESCRIPTION

The goal of this proposal is to obtain a narrow-band Lya image of a gravitationally lensed galaxy at z=1.85 using the WFC3 UVIS F343N filter. We will observe the galaxy in the F343N filter for 6 orbits, and in the F390M filter for 1 orbit in order to obtain an off-line continuum image. For all observations we use the UVIS-C1K1C-CTE aperture in order to place the target near one of the amplifiers in order to minimize CTE effects.

Observations are divided into 4 visits. Visits 1-3 are identical and contain the F343N observations, with 2 orbits per visit. We use the WFC3-UVIS-DITHER-LINE pattern for two exposures per orbit, and include 10 e- FLASH based on the expectation of ~2 e- from sky+dark in ~1400 sec.

Visit 4 contains the F390M observations. We again use the WFC3-UVIS-DITHER-LINE pattern for two exposures per orbit. We include 9 e- FLASH based on the expectation of ~3 e- from sky+dark in ~1400 sec.

All visits are constrained to have the same ORIENT (SAME ORIENT AS Visit 01) in order to maximize image alignment and overlap between exposures for image registration.

Visit

Proposal 14632, Visit 01, completed Tue Nov 22 02:02:12 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

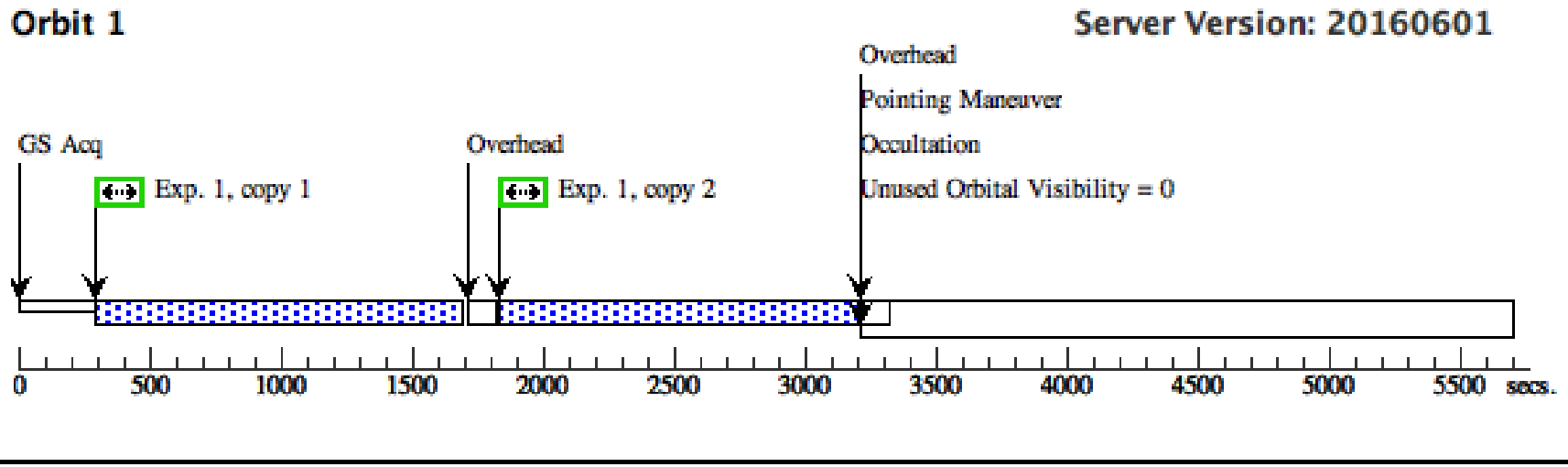
Fixed Targets

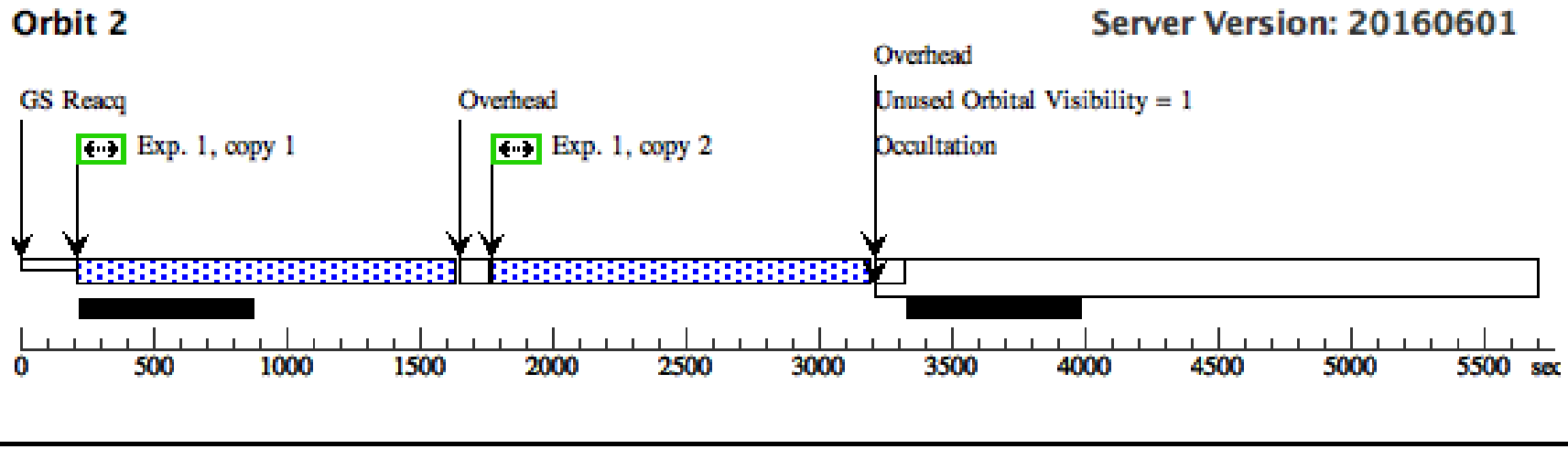
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SL2SJ021737-051329	RA: 02 17 37.2370 (34.4051542d) Dec: -05 13 29.78 (-5.22494d) Equinox: J2000		V=22.07	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SL2SJ021737-051329	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F343N	FLASH=10	GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-1 in Visit 01 (1)	1360 Secs X 2 (5586 Secs)	
								[==>1369.0 Secs (Pattern 1, Copy 1)] *[==>1369.0 Secs (Pattern 1, Copy 2)]*	***[1]***
								[==>1424.0 Secs (Pattern 2, Copy 1)] *[==>1424.0 Secs (Pattern 2, Copy 2)]*	***[2]***

Orbit Structure





Visit

Proposal 14632, Visit 02, failed Tue Nov 22 02:02:13 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: SAME ORIENT AS 01

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

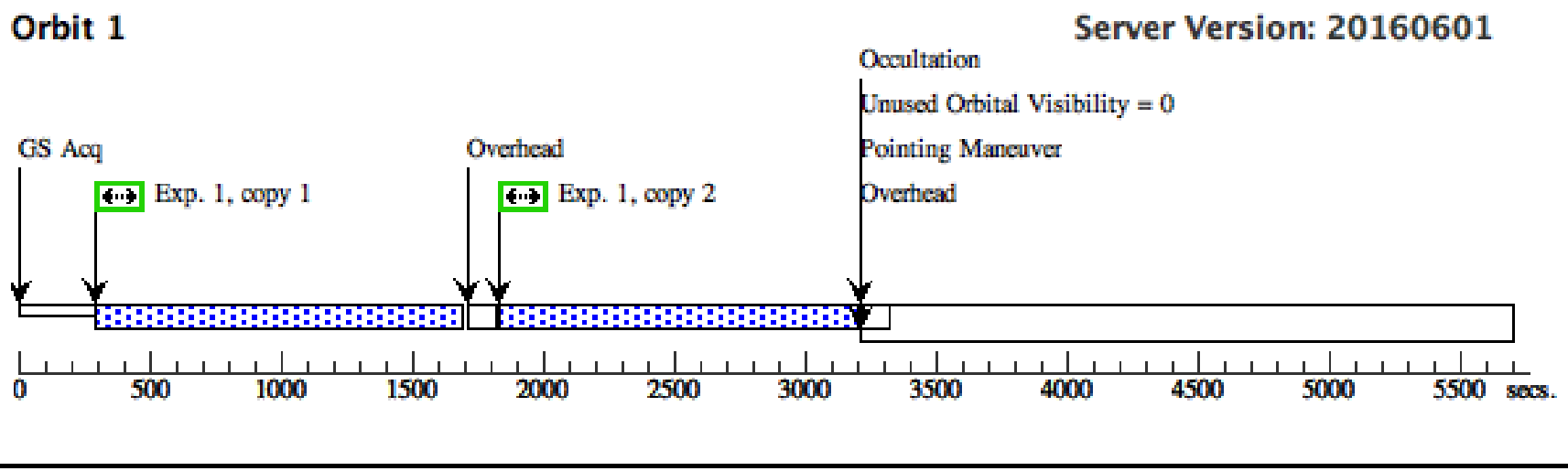
Fixed Targets

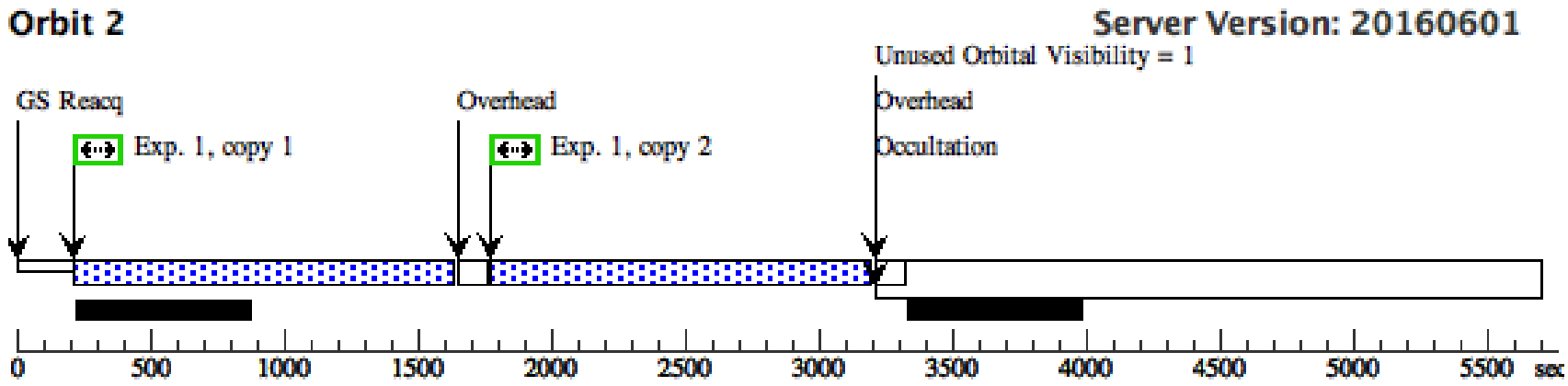
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SL2SJ021737-051329	RA: 02 17 37.2370 (34.4051542d) Dec: -05 13 29.78 (-5.22494d) Equinox: J2000		V=22.07	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SL2SJ021737-051329	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F343N	FLASH=10	GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-1 in Visit 02 (1)	1360 Secs X 2 (5586 Secs)	
								[==>1369.0 Secs (Pattern 1, Copy 1)] *[==>1369.0 Secs (Pattern 1, Copy 2)]*	***[1]***
								[==>1424.0 Secs (Pattern 2, Copy 1)] *[==>1424.0 Secs (Pattern 2, Copy 2)]*	***[2]***

Orbit Structure





Visit

Proposal 14632, Visit 03, completed Tue Nov 22 02:02:13 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: SAME ORIENT AS 01

Patterns

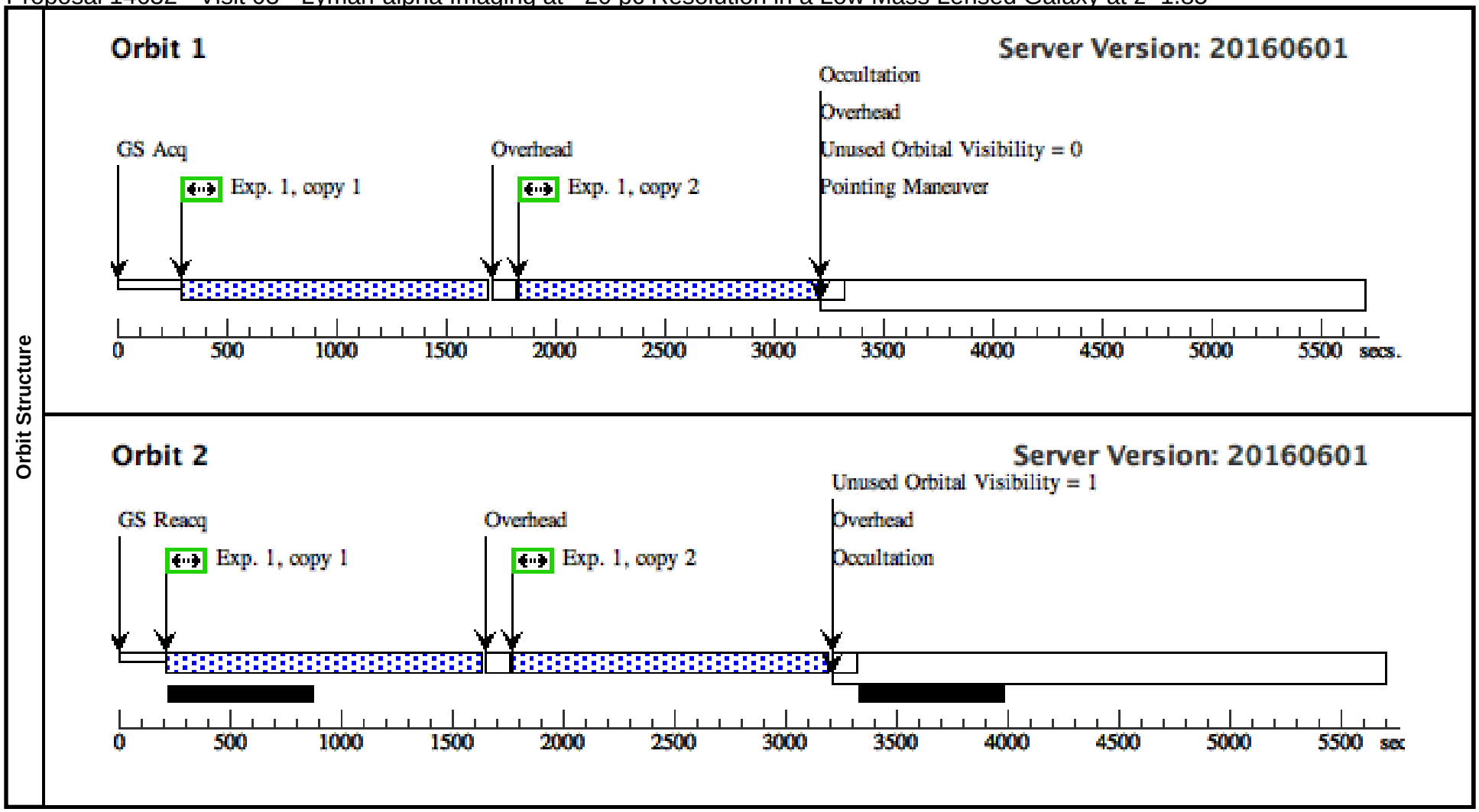
#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SL2SJ021737-051329	RA: 02 17 37.2370 (34.4051542d) Dec: -05 13 29.78 (-5.22494d) Equinox: J2000		V=22.07	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SL2SJ021737-051329	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F343N	FLASH=10	GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-1 in Visit 03 (1)	1360 Secs X 2 (5586 Secs)	
								[==>1369.0 Secs (Pattern 1, Copy 1)] *[==>1369.0 Secs (Pattern 1, Copy 2)]*	***[1]***
								[==>1424.0 Secs (Pattern 2, Copy 1)] *[==>1424.0 Secs (Pattern 2, Copy 2)]*	***[2]***


Orbit Structure
Orbit 1
Server Version: 20160601
Occultation
Overhead
Unused Orbital Visibility = 0
Pointing Maneuver
GS Acq
Exp. 1, copy 1
Overhead
Exp. 1, copy 2
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.
Orbit 2
Server Version: 20160601
Unused Orbital Visibility = 1
Overhead
Occultation
GS Reacq
Exp. 1, copy 1
Overhead
Exp. 1, copy 2
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14632, Visit 04, completed Tue Nov 22 02:02:13 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: SAME ORIENT AS 01

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

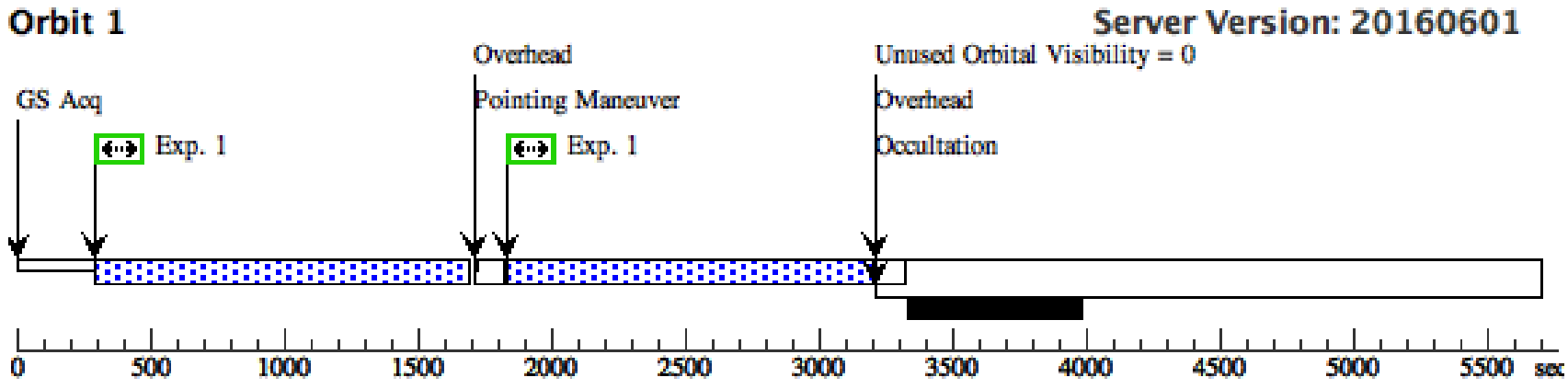
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SL2SJ021737-051329	RA: 02 17 37.2370 (34.4051542d) Dec: -05 13 29.78 (-5.22494d) Equinox: J2000		V=22.07	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SL2SJ021737-051329	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F390M	FLASH=9	GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-1 in Visit 04 (1)	1360 Secs (2738 Secs) *[==>1369.0 Secs (Pattern 1)]* *[==>1369.0 Secs (Pattern 2)]*	*[1]*

Orbit Structure



Visit

Proposal 14632, Visit 52, implementation Tue Nov 22 02:02:13 GMT 2016

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 355D TO 35 D

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SL2SJ021737-051329	RA: 02 17 37.2370 (34.4051542d) Dec: -05 13 29.78 (-5.22494d) Equinox: J2000		V=22.07	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SL2SJ021737-051329	WFC3/UVIS, ACCUM, UVIS2-C1K1C-CTE	F343N	FLASH=10	POS TARG 0.099,0.106; GS ACQ SCENARIO BASE1B3		1360 Secs X 2 (2738 Secs) *[==>1369.0 Secs (Copy 1)]* *[==>1369.0 Secs (Copy 2)]*	*[1]*

Orbit Structure